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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,380	02/12/2004	Alexander Starikov	110348-132026	8996

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EXAMINER	
MULLER, BRYAN R	
ART UNIT	**PAPER NUMBER**
3723	

DATE MAILED: 12/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/779,380	STARIKOV ET AL.	
	Examiner	Art Unit	
	Bryan R Muller	3723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) *4 and 15* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-14 and 16-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-26* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. During a telephone conversation with Christopher J. Lewis on 12/2/2004 a provisional election was made with traverse to prosecute the invention of species I, claims 1-3, 5-14 and 16-26. Affirmation of this election must be made by applicant in replying to this Office action. Claims 4 and 15 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

2. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Objections

3. Claims 1 and 22 are objected to because of the following informalities: Part of line 2 in claim 1 reads "a portion a backside" should be changed to "a portion *of* a backside" and "if" in line 2 of claim 22 should be changed to "of". Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 23 recites the limitation "removing *the actuator* from..." in line 14. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 2, 6, 7, 9-13, 17-19, 21 and 23-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Zuniga (6,210,255).

8. In reference to claim 1, Zuniga discloses a substrate retainer (70) comprising a retainer body (112) configured to removably engage a portion of a backside of a substrate (10) and a flexure (116 or 202) coupled to the retainer body, configured to restrict one or more degrees of movement with respect to the substrate retainer. Flexure (116) is disclosed by Zuniga as being clamped between body (104) and retaining ring (110), both of which are parts of the retaining body, therefore making the flexure coupled to the retaining body. Zuniga also discloses that the flexure is flexible and could be rigid in the radial and tangential directions (col. 5, lines 16-26), therefore restricting one or more degrees of movement with respect to the substrate retainer.

9. In reference to claim 2, Zuniga discloses the substrate retainer discussed supra and further discloses that fluid may be pumped out of chamber 190 to vacuum chuck

the substrate to flexible membrane 118 (col. 7, lines 11-14), therefore removably engaging the substrate through vacuum control.

10. In reference to claims 6 and 7, Zuniga discloses the substrate retainer discussed supra with the flexible flexure that may be rigid in the radial and tangential directions. If the flexure is rigid in the radial and tangential directions, thus resisting in plane lateral movement in the X, Y and Θ directions, the flexure must allow movement in the Z direction because to allow the substrate retainer to move up and down (in the Z direction) to engage and disengage the substrate.

11. In reference to claims 9 and 10, Zuniga discloses the substrate retainer discussed supra and further discloses a loading chamber (108) that may be evacuated or pressurized to respectively raise or lower the flexure and retainer body to control the coupling of the retainer body to the portion of the back side of the substrate. Therefore, in this embodiment, the actuator would be the valve or control that pressurizes or evacuate this chamber. In the orientation that the substrate retainer is shown by Zuniga the flexure and retainer body would need to be moved downward (instead of upward) to facilitate chucking and dechucking but the entire system may easily be inverted and perform in the same manner, thus allowing an upward motion of the flexure and retainer body to facilitate chucking and dechucking.

12. In reference to claim 11, Zuniga discloses a substrate confinement apparatus (20), comprising a global confinement system that causes a substrate to substantially remain in one plane and one or more substrate retainers (70), all of which including a retainer body configured to removably engage a portion of a back side of a substrate,

and a flexure (116 or 202) coupled to the retainer body (104) and configured to restrict one or more degrees of movement of the substrate with respect to the substrate retainer. Flexure (116 or 202) is disclosed by Zuniga as being clamped between body (104) and retaining ring (110), both of which are parts of the retaining body, therefore making the flexure coupled to the retaining body. Zuniga also discloses that the flexure is flexible and could be rigid in the radial and tangential directions (col. 5, lines 16-26), therefore restricting one or more degrees of movement with respect to the substrate retainer.

13. In reference to claim 12, Zuniga discloses a substrate confinement apparatus as discussed supra with 4 substrate retainers (shown in figure 1) that are equilaterally spaced fro each other.

14. In reference to claim 13, Zuniga discloses a substrate confinement apparatus as discussed supra and further discloses that fluid may be pumped out of chamber 190 to vacuum chuck the substrate to flexible membrane 118 (col. 7, lines 11-14), therefore removably engaging the substrate through vacuum control.

15. In reference to claims 17 and 18, Zuniga discloses the substrate confinement apparatus as discussed supra with the flexible flexure that may be rigid in the radial and tangential directions. If the flexure is rigid in the radial and tangential directions, thus resisting in plane lateral movement in the X, Y and Θ directions, the flexure must allow movement in the Z direction because to allow the substrate retainer to move up and down (in the Z direction) to engage and disengage the substrate.

16. In reference to claim 19, Zuniga discloses a substrate confinement apparatus as discussed supra that comprises several substrate retainers, each of which is capable of maintaining the substrate generally in one plane while allowing for independent local out of plane movement of the substrate.

17. In reference to claim 19, Zuniga discloses a substrate confinement apparatus as discussed supra and further discloses a loading chamber (108) that may be evacuated or pressurized to respectively raise or lower the flexure and retainer body to control the coupling of the retainer body to the portion of the back side of the substrate. Therefore, in this embodiment, the actuator would be the valve or control that pressurizes or evacuate this chamber. In the orientation that the substrate retainer is shown by Zuniga the flexure and retainer body would need to be moved downward to facilitate chucking and dechucking but this may be the entire system may easily be inverted and perform in the same manner, thus allowing an upward motion of the flexure and retainer body facilitate chucking and dechucking.

18. In reference to claim 23, the method that would be used to confine a substrate using the substrate confining apparatus disclosed by Zuniga would comprise providing a substrate (10) having process side and a back side, providing a substrate confinement apparatus (20) having at least one substrate retainer (112), each substrate retainer having retainer body configured to removably engage a portion of a back side of a substrate and a flexure (202) coupled to the retainer body (170) and configured to restrict one or more degrees of movement of the substrate with respect to the substrate retainer, positioning the substrate in the substrate confinement apparatus, urging the

substrate retainer toward the portion of the back side of the substrate, coupling a contact surface of the retainer body to the portion of the back side of the substrate, activating a global confinement system, and removing the actuator from the substrate retainer. The activating of the global confinement system would comprise contacting the substrate with the contact surface of the substrate retainer, and evacuating chamber 108 to vacuum chuck the substrate to the retainer. Removing the actuator would consist of evacuating chamber 144 to deflate actuator 140, thus disengaging the substrate retainer.

19. In reference to claim 24, the method as discussed supra that would be used to confine a substrate using the substrate confining apparatus disclosed by Zuniga would further comprise processing the substrate and decoupling the substrate from the portion of the back side of the substrate (col. 7, lines 11-14).

20. In reference to claim 25, the step in the method discussed supra of urging the substrate retainer toward the portion of the back side of the substrate would include providing an actuator (140) and raising the actuator to engage the flexure. This step would require that the substrate retainer be that of the embodiment disclosed by Zuniga that is shown in figure 6. This embodiment still provides the flexure (202) that restricts one or more degrees of movement of the substrate but this embodiment makes the flexure and contact surface out of one piece of material, thus eliminating the need for clamp 174 shown in figure 5, allowing the actuator (140) to directly engage the substrate flexure while pressurized and to disengage the substrate retainer when evacuated. In the orientation that the substrate retainer is shown by Zuniga actuator

would need to be lowered to engage the flexure but the entire system may easily be inverted and perform in the same manner, thus allowing the flexure to be engaged by the actuator by raising the actuator.

21. In reference to claim 26, the step in the method discussed supra of coupling the contact surface to the portion of the back side of the substrate includes supplying a vacuum to the substrate retainer, specifically providing a vacuum to chamber 190 to vacuum chuck the substrate to the contact surface (118) (col. 7, lines 11-13).

22. Claims 1-3, 8, 11, 13, 14, 20 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Sinclair (6,494,769).

23. In reference to claim 1, Sinclair discloses a substrate retainer (100) comprising a retainer body (110) configured to removably engage a portion of a backside of a substrate and a flexure (142) coupled to the retainer body, configured to restrict one or more degrees of movement with respect to the substrate retainer. Flexure (142) is disclosed by Sinclair as being mounted to wafer carrier mount (110) (col. 8, lines 33-35), which is considered by the examiner to be the body of the retainer so the flexure is therefore coupled to the retainer body. Sinclair also discloses that the flexure ring is preferably made of spring steel or another metal having stiff yet resilient properties that would allow some vertical movement of the ring with respect to the retainer body (col. 8, lines 36-40) and it is apparent from the configuration shown that a flexure ring made of a stiff yet resilient material would definitely resist lateral or rotational movement of the substrate with respect to the substrate retainer. Sinclair discloses that, in this

embodiment, wafer carrier 100 and wafe102 do not rotate about any axis substantially perpendicular to the plane in which abrasive pad lies (col. 5, lines 6-10), therefore teaching that the flexure must resist the rotational movement.

24. In reference to claims 2 and 3, Sinclair discloses the substrate retainer as discussed supra and further discloses that the retainer body includes a contact surface (112a) with an aperture (178) extending therethrough to allow activation and deactivation of a vacuum to removably engages the substrate through vacuum control. Sinclair states that cavity 162 can be pressure controlled to affect the wafer through holes 178; for example, a vacuum can be established in cavity 162 so as to apply suction to the wafer through holes 178. Thus, when the wafer carrier is lifted from the abrasive surface, the wafer is lifted with it (col. 9, lines 57-62).

25. In reference to claim 8, Sinclair discloses the substrate retainer as discussed supra that is preferably made of spring steel (col. 8, line 36).

26. In reference to claim 11, Sinclair discloses a substrate confinement apparatus (200), comprising a global confinement system that causes a substrate to substantially remain in one plane and one or more substrate retainers (100), all of which including a retainer body (110) configured to removably engage a portion of a back side of a substrate, and a flexure (142) coupled to the retainer body (110) and configured to restrict one or more degrees of movement of the substrate with respect to the substrate retainer. Flexure (142) is disclosed by Sinclair as being mounted to wafer carrier mount (110) (col. 8, lines 33-35), which is considered by the examiner to be the body of the retainer so the flexure is therefore coupled to the retainer body. Sinclair also discloses

that the flexure ring is preferably made of spring steel or another metal having stiff yet resilient properties that would allow some vertical movement of the ring with respect to the retainer body (col. 8, lines 36-40) and it is apparent from the configuration shown that a flexure ring made of a stiff yet resilient material would definitely resist lateral or rotational movement of the substrate with respect to the substrate retainer. Sinclair discloses that, in this embodiment, wafer carrier 100 and wafe102 do not rotate about any axis substantially perpendicular to the plane in which abrasive pad lies (col. 5, lines 6-10), therefore teaching that the flexure must resist the rotational movement.

27. In reference to claims 13 and 14, Sinclair discloses the substrate retainer as discussed supra and further discloses that the retainer body includes a contact surface (112a) with an aperture (178) extending therethrough to allow activation and deactivation of a vacuum to removably engages the substrate through vacuum control. Sinclair states that cavity 162 can be pressure controlled to affect the wafer through holes 178; for example, a vacuum can be established in cavity 162 so as to apply suction to the wafer through holes 178. Thus, when the wafer carrier is lifted from the abrasive surface, the wafer is lifted with it (col. 9, lines 57-62).

28. In reference to claim 20, Sinclair discloses the substrate retainer as discussed supra that is preferably made of spring steel (col. 8, line 36).

29. In reference to claim 22, Sinclair discloses the substrate retainer as discussed supra and further discloses that the global confinement system includes a plurality of vacuum ports and air jets (178), and a pressure control to maintain the substrate in substantially one plane. Sinclair discloses that cavity 162 can be pressure controlled to

effect the wafer through holes 178 and that a vacuum can be established in cavity 162 so as to apply suction to the wafer 102 through holes 178 or that pressure in cavity 162 can be raised to positive pressure exhausting through holes 178 to release the wafer or to purge any obstruction of the holes 178 (col. 9, lines 57-67). Thus, there is obviously a pressure control and hoes 178 act as vacuum ports and air jets.

Claim Rejections - 35 USC § 103

30. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

31. Claims 5 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zuniga ('255) in view of Gleason (6,390,904).

32. Zuniga discloses the substrate retainer and substrate confinement apparatus as discussed supra but fails to disclose that the contact surfaces are faced with a wear resistant material. Gleason teaches that it is preferred to make substrate retainers that restrict lateral movement of substrates during polishing out of wear resistant materials (col. 1, lines 7-10) that preserve the integrity of the polishing pad (col. 2, lines 16-20) and protect the substrate from damage (col. 2, lines 26-30). Gleason also teaches that common wear resistant materials may scratch or chip the substrate so it would be advantageous to provide a liner or insert to the wear resistant material that would prevent damage to the substrate and maintain the wear resistant characteristics of the

contact surface (col. 6, lines 49-58). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to provide face the contact surfaces of the substrate retainer and substrate confinement apparatus' of Zuniga with a wear resistant material and a liner that will maintain the wear resistant properties and protect the substrates from damage in order to avoid damage of substrates and polishing pads during processing, and to maintain the integrity of the polishing pads. This would minimize unnecessary costs associated with replacing damaged polishing pads or substrates.

Conclusion

33. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Zuniga (6,146,259 and 6,514,124 and 6,776,694), Mosca (6,106,379), Chen (US Pub. 2002/0002025 A1), Park (6,517,421) and Chao (6,739,958) all disclose substrate retainers and/or substrate confinement apparatus' that include flexures configured to restrict one or more degrees of movement and poses other characteristics of the applicant's claimed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bryan R Muller whose telephone number is (703)305-0487. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph J Hail III can be reached on (703)308-2687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BRM BRM
12/8/2004

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